

January, 1917, a very interesting series of 8 days toward the close of the month, on the Schatzalp (above Davos) gave the type of aqueous exchange under the régime of a calm winter anticyclone. During the night, by reason of the considerable fall in temperature of the snowy surface, a slight condensation intervened (e. g., night of Jan. 22-23, a mean of 0.007 mm. per hour); but from sunrise to sunset a many times larger amount evaporated (e. g., on Jan. 23=0.036 mm. per hour).

On the other hand I have determined persistent condensation on the Saint-Gothard during the summer weather of May, 1917, a period when—during the warmest hours—there was equilibrium between the vapor pressure of the air and of the snow bed, but where condensation always prevailed when this did not obtain; the maximum was 0.110 mm. per hour in the night of May 25-26 and during a strong north wind. Of course, the special conditions in the col (high wind with accentuated vertical component) increased the condensation as compared with other stations.

The complete observations will be published and discussed elsewhere.

551.58

#### USE OF MONTHLY MEAN VALUES IN CLIMATOLOGICAL ANALYSIS.

By E. G. BILHAM.

(Abstract of paper presented before the Royal Meteorological Society, London, Dec. 19, 1917.)

[Reprinted from *Nature*, London, Dec. 27, 1917, 100: 340.]

The objects of the paper are (1) to determine to what extent computations based on calendar monthly mean values are vitiated by the fact that the latter are of unequal length; and (2) to provide means of applying numerical corrections on account of errors arising from this cause.

The mean month is defined as an exact one-twelfth division of the year, or 30.437 days, and that period is used as the standard to which the results derived from the actual months are reduced. The matter is of special interest in connection with the computation of Fourier coefficients to represent the seasonal variations of a meteorological element such as temperature. Regarding the year as a cycle of 360°, errors arise from the fact that the monthly mean values will in general differ by small amounts from the ordinates of the curve corresponding with 15°, 45°, etc. The corrections to be applied to the original monthly means and to the Fourier amplitudes have been determined. The use of these corrections is suggested as an alternative to the employment of 5-day means in cases where special accuracy is required.

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#### BATHYRHEOMETER AS ANEMOMETER.

Y. Delage describes in the *Comptes Rendus* of the French Academy of Sciences,<sup>1</sup> experiments looking toward the adaptation of his bathy-rheometer to the purposes of the anemometer. The bathy-rheometer consists essentially of a staff about a meter in length carrying at its upper free end two metal plates mutually perpendicular and of areas sufficient to perform the work expected of them; while the lower end of the staff is attached to a gimbal support, is heavily counterweighted, and probably will be provided with a damping device to counteract the tendency of the staff to vibrate in the rare atmos-

phere under the influence of wind puffs. One of the two metal plates or fins acts as the tail of a windvane, being attached by one edge longitudinally to the top of the staff. The fin perpendicular to the vane-fin is set at an angle of 45° with the axis of and sloping upward away from the staff. Its reaction against the horizontal or inclined air currents tends to depress the staff to a definite amount depending on the velocity of the wind. The orientation and the amount of depression of the staff are recorded by suitable mechanisms linked to the counterweight.

M. Delage designed this instrument to measure and record aqueous motions associated with wave phenomena, and was led to apply it to anemometry by the suggestion of Bayeux who thinks that the device is better adapted to anemometric work in high localities than the usual windmill type of instrument, which frequently loads up with rime and glaze until it can not function. It would seem, however, that the adapted bathy-rheometer is equally liable to give false indications, though some kind of a record will undoubtedly be secured. It is the experience of the Weather Bureau that the tails of the standard windvane, equally with the cup arms of the Robinson anemometer, are subject to loading up heavily with rime and glaze under certain American weather conditions. This would certainly happen to the fins of the bathy-rheometer also, under such weather conditions, thereby giving a temporary "set" to the staff with its overhanging fins, and certainly modifying temporarily the fundamental angle of inclination of the inclined fin.

Furthermore, Delage himself has recently found and, to a certain extent, discussed<sup>2</sup> another source of error inherent to the instrument whether immersed in water or air, viz, vortex movements which are intensified in the stronger currents and cause an erratic registration. On the records by the instrument "these abnormalities appear as parasitic curves which are hard to distinguish" and a mechanism for reducing the disturbing vortex movements has not yet been perfected.

In the first of the two papers cited the author describes and illustrates the meteorological application of his device and works out some formulæ for interpreting its records.—C. A., jr.

#### NITRITES FROM NITRATES BY SUNLIGHT.<sup>3</sup>

By Prof. B. MOORE.

(Abstract of paper presented before the Royal Society, London, Dec. 13, 1917.)

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Dilute solutions of nitrates exposed either to sunlight or to a source of light rich in light-energy of short wavelength (such as light from a mercury vapor arc inclosed in silica) undergo conversion of nitrate into nitrite. There is an uptake of chemical energy in this reaction transformed from light energy, as in the formation of organic carbon compounds in foliage leaves; it is to be added to the relatively small number of endothermic reactions induced by light. When green leaves are immersed in nitrate solution comparatively little nitrite accumulates, indicating that nitrites are rapidly absorbed by the green leaf. Nitrates taken up by plants from soil would, in presence of sunlight, be changed to nitrites, which are much more reactive than nitrates. This indicates that the early stages of synthesis of nitro-

<sup>1</sup> Delage, Y., in *Comptes rendus*, Paris, Aug. 27, 1917, 165: 277-283.

<sup>2</sup> Moore, B. The formation of nitrites from nitrates in aqueous solution, by the action of sunlight and the assimilation of the nitrites by green leaves in sunlight.

<sup>3</sup> Delage, Yves. Utilisation du bathyrhéomètre pour l'anémométrie dans les régions froides. *Comptes Rendus*, Paris, 12. nov. 1917, 165, 659-666.